UNIVERSITY OF CALIFORNIA, IRVINE

BERKELEY • DAVIS • IRVINE • LOS ANGELES • MERCED • RIVERSIDE • SAN DIEGO • SAN FRANCISCO SANTA BARBARA • SANTA CRUZ

April 10, 2009

DEPARTMENT OF COMMERCE
National Telecommunications and Information Administration

FEDERAL COMMUNICATIONS COMMISSION
Office of the Secretary

From:
Professor Scott Jordan
Department of Computer Science
University of California, Irvine
3029 Bren Hall
Irvine, CA 92697
Email: sjordan@uci.edu
Phone: 949-824-2177
Webpage: http://www.ics.uci.edu/~sjordan

Re: non-discrimination obligations of the Broadband Technologies Opportunities Program

NTIA Docket No. 090309298-9299-01
Request for Information: American Recovery and Reinvestment Act of 2009 Broadband Initiatives

FCC GN Docket No. 09-40
Comments Regarding the Commission's Consultative Role in the Broadband Provisions of the Recovery Act

Scott Jordan is a Professor of Computer Science and the Director of the Networked Systems Program at the University of California, Irvine. He served as an IEEE/AAAS Congressional Fellow in 2006, working on telecommunications policy. His research focuses on traffic management, including both technical mechanisms and public policy.

The comments here only address a single issue – the non-discrimination obligations that will be contractual conditions of Broadband Technologies Opportunities Program grants.

The comments here do not necessarily represent the views of anyone but him.

Observations:

(1) Differentiation amongst packets in traffic management is essential for some applications.

Routers and other network devices include mechanisms that may be applied to provide differentiated performance to selected packets. These mechanisms, known collectively as Quality-of-Service (QoS), are essential for applications in which the delay between a user action and the desired network response should be a few tenths of a second or less. Such applications include voice-over-IP (VoIP) and video conferencing. High quality performance to such applications require QoS support by Internet Service Providers (ISPs); there are no good alternatives.

Conclusions:

- **QoS should not be prohibited.**
- **QoS should be accessible to application providers on a level playing-field.**

(2) QoS should be widely available without unreasonable discrimination.

Wide availability of QoS is essential to encourage a diversity of applications and application providers. To ensure availability on a level playing-field, QoS should be available on a non-exclusive basis. If an ISP deploys QoS, it should be available to all subscribers, including residential and business customers who may use or offer applications that require QoS.

QoS mechanisms have a cost to deploy and to use. There is a fixed cost to incorporate QoS mechanisms into network equipment. In addition, there is a marginal cost to support QoS traffic, because QoS traffic requires more capacity than non-QoS traffic at the same bit rate. However, the fixed costs are small relative to the cost of the network equipment, and the marginal costs are proportional to the amount of QoS traffic. Therefore, any charges for QoS should be without unreasonable discrimination. In addition, these charges should either be proportional to the amount of QoS traffic or incorporated into the subscriber tier. Accordingly, they should not be a barrier for small application providers.

Conclusions:

- **If an ISP deploys QoS, it should be available to all subscribers on a non-exclusive basis.**
- **It is unreasonable to mandate that QoS should be available at no additional cost to subscribers.**
- **Any charges for QoS should not be unreasonably discriminatory.**

(3) Public policy should discourage ISPs charging non-subscribers for QoS.

The most efficient method for wide availability of QoS would be for ISPs to incorporate QoS into the Service Level Agreements (SLAs) that dictate their peering arrangements. Some SLAs that currently arrange for reciprocal peering without charge may similarly promise to honor the QoS commitments from an ISP's peer. Other SLAs that charge based on volume to transit traffic may arrange for an additional charge per unit volume for QoS transit.

A subscriber, whether residential or business, would thus only have to obtain QoS directly from their own ISP. End-to-end QoS would be provided through the SLAs of the ISPs on the route without the need for the subscriber to separately pay multiple entities for QoS.

Proposed Non-discrimination Obligations:

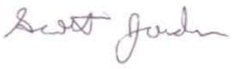
The following language may be used to incorporate the above conclusions into contractual non-discrimination obligations.

DEFINITIONS
(1) INTERNET INFRASTRUCTURE SERVICES. The term 'Internet infrastructure services' means all services- (A) over a network that uses a public right-of-way; and (B) that reside at or below the network layer or are required to manage the network.
(2) INTERNET APPLICATION SERVICES. The term 'Internet application services' means all services- (A) over a network that uses a public right-of-way; (B) that are not infrastructure services; and (C) that do not fall under Title VI of the Communications Act.
(3) NETWORK LAYER. The term 'network layer' means the third layer of the 7-layer Open Systems Interconnection Model, responsible for message addressing and for routing information within the network, including routing within the telephone network and including the Internet Protocol within the Internet.
(4) ACCESS NETWORK -The term 'access network' means the portions of the Internet service provider's network which must be transversed to form routes from the Internet to its subscribers.

DISCRIMINATION AND PREFERENCES
For purposes of section 202 of the Communications Act, an Internet service provider obtaining funding under the Broadband Technologies Opportunities Program shall be treated as a common carrier, and Internet infrastructure service shall be treated as a communications service.

COMPETITION
(a) For purposes of section 10 of the Communications Act, an Internet service provider obtaining funding under the Broadband Technologies Opportunities Program shall be treated as a telecommunications carrier, and Internet infrastructure service shall be treated as a telecommunications service.
(b) An Internet service provider obtaining funding under the Broadband Technologies Opportunities Program shall make available to subscribers and other Internet service providers - on the same prices, terms, conditions of sale, and delivery – any Internet infrastructure services provided on its access networks as the Internet service provider offers to Internet application services provided by itself or its affiliates.
(c) An Internet service provider obtaining funding under the Broadband Technologies Opportunities Program shall provide Internet infrastructure service to subscribers and other Internet service providers, that is at least equal in quality to that provided by the Internet service provider to itself or its affiliates.
(d) An Internet service provider obtaining funding under the Broadband Technologies Opportunities Program shall not engage in unfair methods of competition, unreasonably discriminatory conduct, or unfair or deceptive acts or practices, the purpose or effect of which is to hinder significantly or to prevent any Internet application provider from providing content, applications, or services to consumers.

Respectfully submitted,



Scott Jordan
Professor of Computer Science
Director, Networked Systems Program